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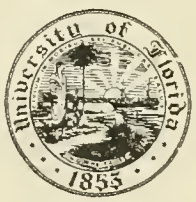

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THE PANAMA CANAL REVIEW

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PANAMA CANAL REVIEW

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About Our Cover

THE COLOR photo on our cover shows picturesque Goofy Lake in Cerro Azul, about 25 miles east of Panama City. The highest point in Cerro Azul is 3,700 feet while the lake itself is 2,150 feet above sea level, altitudes that provide an invigorating, cooling change from Panama City. From the paved road that winds its way up, the motorist is treated to sweeping views of the rolling green mountains and of the lake.

Cerro Azul is but one of several areas of natural beauty near Panama City worth the effort of driving. There are others which, without the benefit of ballyhoo, await the visitor. A few of these locales are discussed in an article beginning on page 10.

Veteran sea captains who command huge tankers are learning more about their profession at a small, man-made lake in the foothills of the French Alps. It may sound a bit farfetched at first but in reality is a cleverly engineered operation that sharpens the skills of the captains selected for the program. The story of the school for skippers is an intriguing one and begins on the opposite page.

The hobbyist who collects objects—whether they be stamps, coins or whatever—builds a vast knowledge of geography, history, and other matters through his collections. So it is with the collectors of bottles, who dig the bottles from the soil, retrieve them from the ocean floor, and occasionally even uncover them at dumps. An account on the active Isthmian bottle collectors begins on page 6.

Computers have been put to work to solve some of the problems concerning slides in the Panama Canal. Starting on page 16 is a report on how the Canal's Civil Engineering Branch is using these ultramodern machines to answer questions that have plagued engineers since construction days.

Cockfighting is the topic of an illustrated article that begins on page 21. This pastime flourishes today in Latin America, though it is banned in many nations of the world. The fans in Panama are perhaps as avid as lovers of cockfighting anywhere; there are cockrings in almost every town and city in the Republic.

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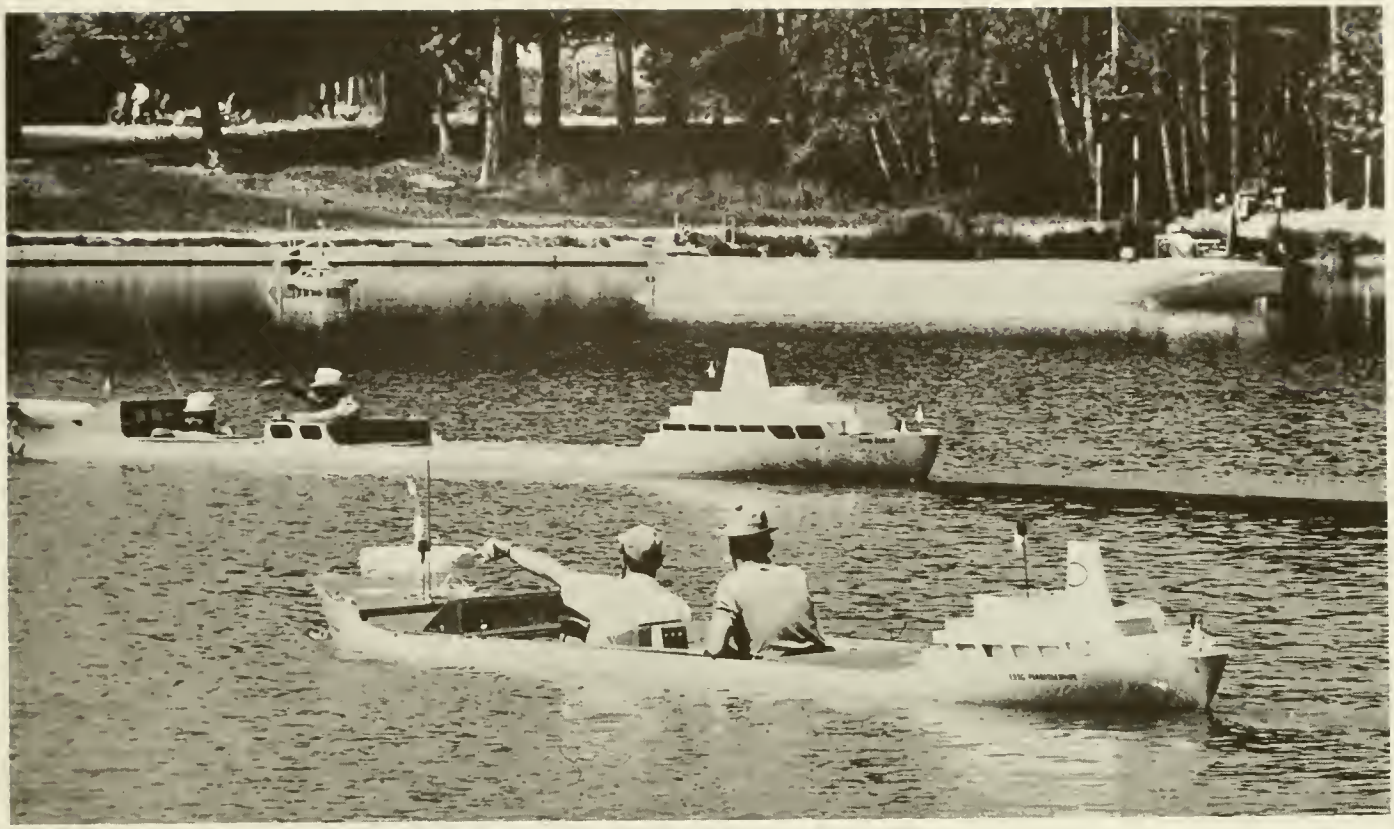
James P. MacLaren displays several of his old bottles in a bamboo bottle tree. Bottles on the table include case bottles, patent medicine, food, gin, whisky, bitters, French mustard, Scotland beer, and other relics. MacLaren became a bottle collector by chance when he was lost while reconnoitering for pieces-of-eight on the Las Cruces trail. He found an early handblown bottle and was hooked!



Esso tanker captains maneuver their precisely scaled models during lake exercises at Grenoble. The models represent ships of 38,000, 80,000, and 191,000 deadweight tons, which the student-skippers learn to command.

Photo by Standard Oil Co. (N.J.)

Set in the French Alps

School for Ship Captains

(The following article appeared in a recent issue of *The Lamp*, Standard Oil Company (New Jersey) publication, which granted permission for this reprinting in THE PANAMA CANAL REVIEW.)

By Robert K. Bruce

"NEVER THOUGHT I'd be going back to school on a ruddy little inland lake," said the British sea captain with a laugh. For the past 6 years he had been a pilot for Esso at the Libyan oil port of Marsa el Brega on the Mediterranean. guiding tankers to their moorings in all weather. But at the moment he was taking part in a 2-week course in ship-handling at the Esso Marine Research and Training Center, a unique institution located 35 miles northwest of Grenoble, France.

On arriving at the center, he and his seven classmates, all of them tanker captains, displayed a certain skepticism toward the program that awaited them. After all, their seagoing experience ranged from 14 to 30 years, and each had established his competence beyond question. Why, at this advanced stage of their careers, had they been asked to this secluded spot in the foothhills of the Alps to pilot model ships on a man-made lake?

The answer lies in the dramatic growth in the size of tankers being built in recent years and Jersey Standard's recognition of the need to develop training techniques to help its captains and harbor pilots make the transition from smaller ships to the supertankers coming into service. In the past, tankers in the Jersey fleet grew in relatively small increments, and it was possible for captains and pilots to predict maneuvering and navigating characteristics of each bigger ship on the basis of experience with the next smaller class. At 191,000 deadweight tons, however, the recently completed *Esso Malaysia* is 100,000 deadweight bigger than the largest Jersey tanker before her and is the first of six ships of this class. The current building program also includes 13, 240,000-deadweight-ton vessels, with the first one due to enter service in 1969. There are few guides for handling such vessels, and thus it is imperative to give shipmasters as much knowledge as possible about proper handling before they ever set foot on the actual ships.

"Before the first group got here, we knew what the initial reaction of the men would be," acknowledged Capt. Alf Lindh, one of the center's three instructors and himself a veteran ship-

(See p. 4)

Ship Models Perform Like Big Vessels

(Continued from p. 3)

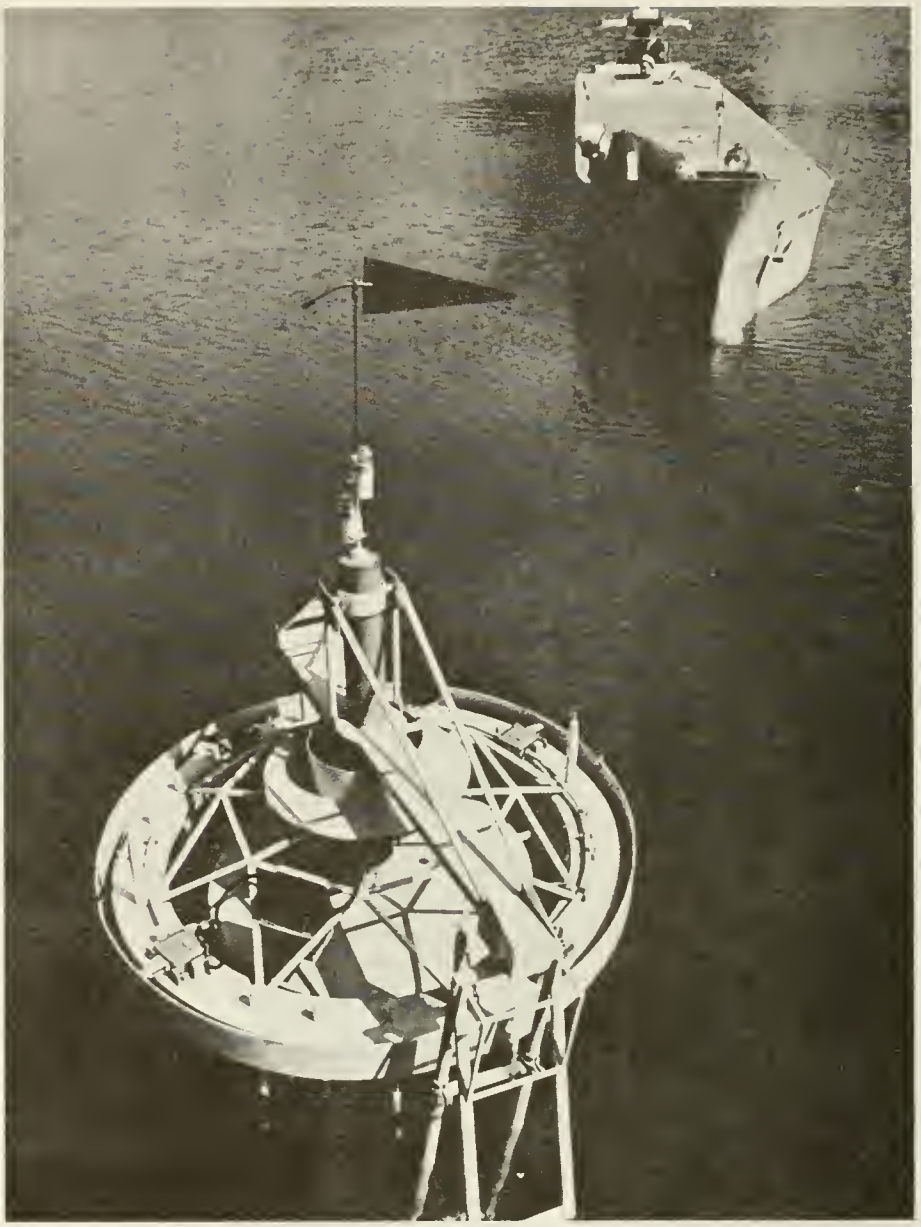
master and pilot. "They have every right to question our methods and our ability to teach them something they don't already know about shiphandling. I think we would be disappointed if they didn't."

Capt. Joe Johnston, who played a major role in developing the training program and who now teaches at the center, goes a step further. "The skepticism these men bring with them is actually an advantage. It makes all the more meaningful the moment when they discover for themselves the remarkable similarity between handling a model on the lake and a full-sized tanker at sea."

There are four models. The largest is the *Esso Brittany*, a 1 foot to 25 foot scale copy of the 191,000 deadweight *Esso Malaysia*. It is 42.5 feet long, has a beam of 6.5 feet, draws slightly less than 2.5 feet, weighs nearly 14 tons, and will hold three men. Another 1 foot to 25 foot model is the 38,000-deadweight *Esso Berlin*. It is 26 feet long and holds two men. The *Esso Grenoble* is also a model of the *Esso Malaysia* class but on a scale of 1 foot to 40 foot. It is 25 feet long and, like its larger sister, holds three. The *Esso Pembrokeshire*, a 1-foot to 40-foot model of its 80,000-deadweight namesake, is 20.5 feet long, and holds two people.

The models are not intended as exact miniatures in every detail of their full-sized counterparts. There are none of the pipes, walkways, ladders, and hatches that clutter a real tanker deck. The normally flat deck is broken by places for the helmsman and—in the two 191,000-deadweight models—the "deckhand" to sit.

But meticulous care has been taken to make the models perform exactly like the big ships. For example, the electric drive motors produce the precise scale equivalent power as the big ships' engines. It takes a while to reverse the engine of a ship or to increase or decrease its speed. Electrical relays simulate this time lag in the models. Similarly, a series of relays times the movement of a model's rudder to correspond with that of the real ship.



As the Brittany eases toward a model of the Esso mooring tower at Marsa el Brega, its deckhand gages the remaining distances.

Photo by Standard Oil Co. (N.J.)

In all the models, the captain sits with his eyes at the level they would be if he were standing on the bridge of a full-sized ship. If the bow of his model blocks the view of a buoy, he'll know that the big ship will restrict his vision in exactly the same manner. So detailed is the simulation of performance that the model's anchor chains will break under a strain equivalent in scale to that which could snap a full-sized chain.

A visitor to Esso REM (For Recherche et d'Essais pour la Marine) can detect none of this realism as he watches the models maneuvering on their 9-acre sea. But he can sense it in the animated conversations of the captains during the classroom sessions and at the excellent family-style lunches served in the weathered farmhouse that is headquarters for Esso REM. And, seeing the fatigue on the men's faces at the end of a day of lake practice, he can well understand Captain Johnston's remark that 2 weeks at the center provide the captains with years of additional shiphandling experience. But even these impressions in no way prepare the visitor for the astonishing illusion that sailing in one of these models creates.

Occupants of the helmsman's and deckhand's positions in all but the largest model half recline in their seats, their

eyes at approximately the same level as those of a man standing on the deck of a full-sized tanker. Seen from this position, the water stretches away for great distances, the now remote shorelines blurred by heat waves rising from the surface. The lake's 9 acres suddenly become the 30 square miles of ocean they represent in scale with the model.

From his forward seat in a 191,000-deadweight model, the visitor can look back along the broad main deck and appreciate fully the tremendous size of the 1,062-foot giant after which it is patterned. He experiences the same feeling, watching the gray hull of another model glide past, that he would meeting a ship at sea.

Added to his visual impressions are the dimensions of motion and sound. The model's speed and the way it reluctantly begins a turn, then swings with increasing speed as the rudder overcomes the vessel's forward momentum, have the feel of a real tanker. The motion produced by a wave-making machine evokes vivid memories of tankers churning through heavy seas. The electric motor's high-pitched whine, which has no place in the steadily building illusion, is soon forgotten. Another sound replaces it, the half-heard, half-beat of the propeller. Each model is equipped with a radio system that permits conversations between crew positions on the model, with other boats on the lake, and with the instructors, who oversee the exercises from outboard-powered launches. Conversations are crisp and professional. Listening to them, one might easily be picking up messages from the waters around a busy tanker terminal.

Participants in the program must pay unceasing attention to the operation of their ships. An Italian captain summed it up at the conclusion of an exercise. "You can't relax a minute. You have to concentrate all the way."

The lake, shaped like a dented oval, is about 900 feet at its longest point and 600 at the widest. It was built by Trappist monks in the 17th century to raise fish for the tables of French monarchs, was redesigned and enlarged for Esso REM. After the lake had been drained, its bottom was carefully shaped to form shoals, bays, channels, and deep-water areas, all in 1 foot to 25 foot scale. A 400-foot-long replica of an actual bend in the Suez Canal was carved out of the western bank. Scale hydrographic charts, used throughout the training program, show depths ranging from 250 feet in the center to 40 feet near the northern entrance of "Suez." In actual fact, these represent water depths of 10 feet and 1.6 feet. These latter figures are not likely to be heard at the the center, however, for a reason that was explained to a visitor by Joe Johnston during an early morning walk from the office to the boathouse. The route passes a small dam built to help keep the lake at a constant level. This summer, however, the problem was one of too little water, rather than too much. Unusually dry weather had reduced the inflow to a trickle.

"The lake is really low today," Captain Johnston commented. "It's down about 7 feet." When his companion mentioned that it looked to be only about 2 inches below the spillway, the captain smiled and said, "We don't like to talk in inches or centimeters here. As long as we can keep the captains thinking in terms of feet, those are real ships they're in and the training will work."

Equipment on the lake includes a replica of the unique Esso-designed

(See p. 13)

The 42.5-foot Esso Brittany negotiates a difficult turn at a bend in the channel.
Photo by Standard Oil Co. (N.J.)

Elizabeth Robinson, daughter of Mr. and Mrs. Frank Robinson, holds a beautiful black glass specimen from the collection of magnificent case bottles found in Robinson's collection. Robinson began collecting bottles in 1950 and his parents were collectors.

Bottle Buffs Read History In Old Glass

THE CLINK of a spade striking glass is music to the ear of the bottle buff digging in hard ground. Carefully, diligently, and expectantly, he digs away not to break or mar the object which may be a rare specimen—or just another piece of broken glass. Searching for bottles which are no longer in use can be great fun and working toward a collection, an absorbing and satisfying hobby.

More than a dozen bottle enthusiasts in the Canal Zone pursue this fascinating activity. They are unsung historians who, by piecing together bits of information on bottles, are digging out facts about different areas and eras of culture. They experience the thrill of finding something that once served and lay buried and untouched, perhaps for many years. They have the fun of buying and selling or swapping their loot which may have come from the dump!

Bottle collecting is becoming more and more popular on the historically colorful Isthmus where Spanish, English and French pirates trod the trail from the Chagres River to Panama City. Years later, the 49'ers used the same route to go from New York to the gold fields of California.

Many tossed their empties of whisky in the brush after quenching a tropical thirst. Later still, thousands of construction workers on the Canal added their depleted bottles of bitters, whisky and patent medicines to the debris on the Isthmus. Much of this accumulation of bottles which was not broken or pulverized, plus bottles which once contained food, cosmetics, and household liquids, now lie half buried in the jungle, in the sea, in old dumps, and anywhere that man paused to feed himself and administer to his ailments.

Collectors rummaging for these early day bottles on the Las Cruces trail have found hand blown bottles dating back to the 1860's, and flaws and color of several finds indicate much older bottles. Very often they pick up pieces, necks and bottoms with blob seals. Finding one of these often gets a person hooked on bottles. More fortunate collectors have found valuable coins without too much effort.

Bottle collecting on the Isthmus does not involve a great deal of back-breaking digging. On weekends, collectors may be found scavenging old dumps, uncovering jungle growths, and even donning scuba diving gear to search in the ocean. Remains of the original 25 Canal construction townsites are the most fertile grounds and have exposed many rare old bottles. Areas such as Gorgona, Culebra, Matachin, San Pablo, Las Cascadas, Lion Hill, Nombre de Dios, and many other Canal construction sites once inhabited by workers have left a legacy of beautiful black glass, clay, stoneware, aquamarine, and other crudely made bottles. They have been found under sidewalks, beneath fallen tree trunks, in the water and in old bottle dumps. A collector knows that pieces of broken glass glistening in the distance may be the key to an old dump and a depression near an old building may have been a garbage dump and yield rare old bottles.

Taboga Island with its historic past, has rewarded collectors with perhaps the most valuable specimens in terms of years. As far back as the 16th Century Taboga and its surrounding islands supplied provisions for Panama City. Galleons for the conquest of Peru were built here and these same ships, laden with gold treasures, stopped here where the riches were unloaded for an overland trip to the Atlantic coast of the Isthmus, and from there on to Spain aboard ship.

Later Taboga harbor was a hive of activities offering snug mooring, fresh water and supplies for vessels plying the Pacific. Ships from many nations stopped at the Pacific Mail Steamship Company coal houses and machine shop and took on or deposited Welsh coal and bottles of medicine potions (some made by a Scotchwoman there). Canal Zone bottle collectors diving in Taboga Bay bring up these bottles of medicine potions, compounds of castor oil, soda water and whisky.

The soda water bottles, called tear drops by collectors, were often used as ballast in ships from England and Scotland. Several of these, filled with dirt, marine life and bearing barnacles are now in the possession of Canal Zone collectors. Some of the oldest Taboga bottles have been found by scuba diver collector Sgt. Dion Daugherty. One of the finest specimens has been found by shell-collector Elizabeth Ballerini (wife of a Gorgas Hospital doctor) on Kobbe Beach across from Taboga.

On the Atlantic side, bottle collectors Luke Palumbo and Jim Collins search for old bottles out toward Fort Sherman and San Lorenzo. Palumbo's collection contains several handblown bottles, black glass square bottles, inkwells and a variety of medicine containers. Bottle collecting is a family project with the Collins family which includes 5 children —all avid collectors. Their collection of approximately 300 specimens includes bottles and inkwells from many parts of the world. Of particular interest are several one gallon moonshine jugs from Jamaica, France, and the United States and medicine bottles which are embossed with porcelain. Several bottles date prior to 1849, probably 1830's and early 40's and some bottles Collins dug in a village, which according to maps, dated back to 1763.

One of the first Canal Zone collectors was Adrien Bouche, member of a well-known Canal Zone family, who began digging about 20 years ago when bottle collecting was little known on the Isthmus. His collection, relatively small in number, is compensated by the high quality of his selections. Bouche believes that the most valuable bottles come from deep in the ground and that is where most of his come from —the old townsite dumps at Gorgona, La Pita, the Las Cruces trail and the sites of towns in existence before Canal construction days.

Scuba diver-collector Sgt. Dion Daugherty holds a French ink and a Taboga bottle from his collection of antique bottles. His are some of the oldest found near Taboga.

A Chinese rice vinegar jug and two lovely Chinese bottles which look like vases, and probably contained wine, are outstanding in the collection. These bottles may be an indication that Chinese had once established themselves as merchants in food in these areas. Several old beer bottles he found in La Pita (a signal station on the Cut), and labeled Drew's Doppell Kronenbier, are the only ones of this type to be found in the Isthmus. Perhaps a La Pita resident had a particular fondness for that German brew and imported it for his exclusive drinking pleasure.

A handblown bottle he picked up in Boquete showing the whittle marks of a wooden mold is truly a collector's treasure. Two dog-bottles (having pictures of dogs) Bouche picked up in a drainage ditch excavation in Bocas del Toro, marked JJW Peters, one with a dog's head and the other plain, are more than 100 years old.

In digging up these relics Bouche has exposed such articles as old wood and coal burning stoves, grates, coins, iron beds, springs, high-button shoes, spittoons, clay pipes and many other objects of a bygone era. Some of the bottles found in the entanglement of these articles have a film over the glass caused by the action of water seepage on the

(See p. 8)

Broken concrete slabs near a large tree root at Gorgona have been lifted to reveal these clay bottles which were used as a base under the concrete. Usually the bottles were placed neck down, side by side to make a firmer base. They were used also to outline graves.

Bottles Tell History Of Isthmus and World

(Continued from p. 7)

old imperfect glass. The glazed clay bottles he has found buried deep in the earth have an etching caused by alkaline substances which has worked on the glass over the many years.

It is apparent that a large number of clay bottles (some made by Doulton) reached the Isthmus from England and Scotland. They are the most common bottles found in the Canal Zone collections. These hardy empties were used (upside down) to outline graves and gardens. Their ruggedness is responsible for their surviving the ravages of time.

Frank Robinson, who is with the Hydrology Section of the Interoceanic Canal Studies, and his brother John, who began collecting in 1950, are among the early Canal Zone bottle buffs. Their parents also were Canal Zone bottle collectors before them. Frank Robinson's collection includes a variety of magnificent case bottles, the very dark bottles whose square shape allowed 12 bottles to be packed in a case. The elegant large bottles contained gin from Holland. Among his outstanding and beautiful case bottles is one picked up by a friend at an old abandoned tin mine in Australia.

James Fulton, a newcomer among the bottle collectors, has amassed a collection of approximately 1,500 specimens in about 1 year of bottle hunting. His most recent acquisition is a lovely demijohn found in the Interior of Panama which could be 150 years old. His large collection consists of every variety of bottle on the Isthmus. There are clay beers, rum, whisky, gins, dog-bottles, taper gins, bitters, cosmetics, Paraiso Springs Coca-Cola, wines, black glass, blue medicine, inks and many others. His favorite is the square Aromatic Schnapps bottle from Holland. Fulton has found most of his bottles along the Canal and not more than 2 inches below the ground.

J. P. MacLaren, Chief of the Sanitation Division, an enthusiastic collector, is currently displaying a bottle collection at the Canal Zone Library-Museum. His remarkable collection of approximately 500 quality bottles includes beverages, household and patent medicine bottles from many parts of the world —the U.S., the Caribbean, many European countries and from as far off as India. He points out Canal Zone bottles which are collectors' items simply because they are bottles of this area. One of the oldest is a Niagara bottle embossed with the names J. E. Duncombe, Canal Zone, R.P. and I. L. Maduro, Canal Zone, which contained soda water, lemonade and other sweetened carbonated beverages, and has a marble in its pinched top to let out a jigger at a time. The same bottle has been found embossed "Isthmanian Aerated Water Factory, Colon" showing the wide usage of all bottles for different beverages.

Medicine bottles in the MacLaren collection bear such names as Pink Pills for Pale People, Lydia Pinkham's Blood Purifier, Benjamin's Lung Balsm, Davis Vegetable Pain Killer, Chamberlain's Colic, Cholera and Diarrhea Remedy, and Morses Indian Root Pills.

It is interesting to note that the patent medicine habit was a serious and dangerous one in the United States at the turn of the century. A mother who gave her child a dose of Mrs. Winslow's Soothing Syrup was actually doping the child to sleep with opium! When our grandmothers nipped a bottle of Ayer's Cherry Pectoral for their colds, they were drinking a mixture of 34 percent heroin! A large number of these products found their way to the Canal Zone.

Bottle collectors usually classify their bottles according to the contents they once contained. Bottles for beverages probably have the most extensive assortment with bitters bottles taking the lead. When a stiff tax on the sale of gin and the number of pubs went into effect in England, a surprising number of apothacary shops came into existence selling medicinal gin to help cure the ailments of the day. The practice carried across the Atlantic to the United States and a new product, bitters, was born and became very popular. More than 400 kinds of bitters were put on the market to relieve the aches, pains and thirst of our ancestors who enjoyed their liquor under the guise of cure-alls. Many of these are found in the Canal Zone bottle collections.

Dating a bottle and getting the facts of a find may involve considerable research such as writing to companies, researching lists of businesses which have been inactive for many years, and contacting other bottle collectors.

The actual value of a bottle is not necessarily determined by age. A collector may be interested in embossed bottles, bottles of a certain age, color,

shape or height, bottles of a particular method of manufacture, or other categories according to his whims. Collectors know that bottles made from earliest times to about 1860 were free blown, made by a glassblower who dipped the end of his blowpipe into a pot of molten glass and the size and shape of the bottle was determined by blowing and reheating the bubble at the end of the blowpipe. The worker cut the glass from the blowpipe leaving a rough scar referred to as a pontil mark. This mark is the surest sign of a valuable collectable bottle. Free blown bottles were never alike. They were often lopsided, had uneven walls and crudely applied lips, as the lip was applied after the bottle was shaped. Another sure sign of a very old bottle is a "sheared lip" (before 1840). The lip was formed by simply cutting the glass free of the blowpipe with a pair of shears, leaving the lip with a stovepipe look. After 1840, bottle makers applied a ring of glass around the sheared lip.

Wooden molds were used from about 1800 to 1860. These molds were whittled from apple or maple wood and the bottles cast in these carved molds have the telltale whittle marks which collectors look for. The molds were in two, three, four or five pieces. The glassblower blew a few puffs lowering a glass lump into the hollow mold and then continued blowing into the tube until the glass was forced against the sides of the mold. Raised letters were whittled in the molds and the molten glass took the shape of the container. Ninety percent of the bottles made before 1904 were not embossed. Before the Civil War, instructions for taking a medicine or the name of a firm was written on a piece of paper and tied to the neck of the bottle.

Molds were replaced by semi-automatic machines and then in 1903 an automatic bottle-making machine came into existence. But it was 10 years before machinery replaced hand blown mass production of bottles.

The fascination of searching for these bottles that reveal what our Isthmian forefathers drank, ate, and used to cure their ailments, has captured the fancy of several other Canal Zone collectors such as, Alwyn Sprague, Carl Glass, Kenneth Manthorne, Al Chandler, Robert Stewart, Edward McFarland, Charles Rheberg, Gustave Bliss, Karl Longley, Lois Harrison, and Judy Williams.

Bliss, who is with the 352d, U.S. Army Aviation Detachment at Fort Clayton, has found the subject of glass recovered on the Isthmus so intriguing that he is writing a historical narrative with pictorial views of the bottles found in the Canal Zone and vicinity. Bliss' efforts are sure to be invaluable to future collectors and historians.

Pati and Doree MacLaren hold an early French wine bottle found underground along the Las Cruces trail. The assortment of bottles in front includes "tear drops," round bottom sodas, French champagnes, Taboga dark glass, food, beverages, and medicine bottles.

Vistas Abound In Panama's Countryside

La Angostura, a miniature Grand Canyon, is approximately 100 miles from Panama City on the road between Penonomé and La Pintada, in Coclé Province. It is one of the most scenic spots in Panama's interior but is known by few Americans.

UNSUSPECTED NATURAL beauties lie within easy distance off Panama's main highway.

Picturesque towns and sights abound, to be sure, along the Inter-American Highway from the boundary with Costa Rica to Chepo, 37 miles east of Panama City. But for the motorist willing to exert a little effort, the reward can be an unforgettable sight or spot.

A dirt, gravel or macadam road branching off the pavement usually leads to such a reward.

Goofy Lake in Cerro Azul, El Chorro in La Chorrera, and La Angostura in Penonomé are three examples of spectacularly beautiful places off the beaten path.

Cerro Azul is 25 miles east of Panama City, an hour's drive. The turn-off is roughly midway on the road between Tocumen Airport and Pacora.

The development started in 1943 when Juan Euribiades Jiménez, a prominent Panama City businessman, purchased a 3,000-hectare (7,500 acres) tract. He became interested in the place when he was told by a visiting German urbanization expert that an area with Alpine climate lay close to the capital city and would provide an ideal development area. Later a road was built from the Pacora Highway to Cerro Azul. The name, incidentally, was inspired by the Blue Ridge Mountains in Virginia.

When Jiménez purchased the land, there was no lake. About 3 years after he acquired the property, he was on a hunting trip with a guide from the area and they came onto a marshy valley. The guide told him the area flooded during the rainy season, becoming a lagoon. He said he was sure if a retaining wall were built, the waters would be trapped and a year-round lake would be formed.

That's how Goofy Lake was conceived.

Jiménez decided to tackle the project. A Panamanian engineering firm drew the plans and carried out the construction of the dam, which is a terraced dirt structure with a rock reinforcement in the middle.

Friends called Jiménez "gufy" (a phonetic Spanish adaptation of "goofy"), he recalls now, "so I decided that if I was goofy, then it should be called Goofy Lake."

The project was begun in 1945 and the lake was ready in 1950.

"The wall is still there," Jiménez says with a smile.

Goofy Lake covers 25 hectares (62.5 acres) and its average depth is 33 feet. It is 2,150 feet high (the highest point in Cerro Azul is 3,700 feet).

Shortly after the lake was ready, Jiménez had it stocked with 200 big-mouth bass which he imported from the United States by air. To feed the bass, he later put in bluegill which he obtained locally. Anglers who visit Goofy Lake now catch the descendants of the original 200 big-mouth bass.

Today, scores of families have per-

Beautiful homes have been built in Cerro Azul, from where residents commute the 25 miles to their places of work in Panama City.

Scenery Charms Motorists

manent or weekend homes in Cerro Azul.

The possibilities for the future are promising. Two large coffee plantations are flourishing in Cerro Azul. One, owned by Agro, S.A., a firm established with U.S. capital, has 128,000 coffee trees growing and is planting 100,000 more in May. Pastures already are being developed for cattle raising. Five thousand acres are still to be developed.

The time will come, Jiménez is confident, when the long-planned road connecting Cerro Azul and Mandinga, on the San Blas Indian Reservation on the Atlantic mainland, will be a reality. When that happens, he says, Cerro Azul will be the ideal place for a first-class tourist resort. Already there is a project for a motel atop Cerro Jefe, the highest point in the area.

In the opposite direction—west of Panama City—is La Chorrera, a thriving town only 25 miles from the capital. The route to El Chorro (literally The Gush) traverses the central part of the town, on the outskirts of which it becomes a hard-packed dirt road leading directly to the edge of the falls, about 15 minutes by car.

At this spot, the Caimito River falls 33 feet into a natural pool 130 by 195 feet and 14 feet deep. At their widest point, the falls measure approximately 65 feet.

Some of the natural charm of the spot has been marred by the intrusion of progress—a small power generating plant that combines hydroelectric and thermic installations. But it still is a natural beauty worth seeing.

La Angostura (literally The Narrowness) is different from El Chorro in a breath-taking way. It can be likened to a miniature Grand Canyon.

The spot is approximately 100 miles southwest from the capital on the road between Penonomé and La Pintada, two of the most attractive towns in Panama's interior. La Pintada, incidentally, is famous for its hand-woven "montuno" hats.

The mile-long detour to La Angostura requires very slow driving (in the dry season, a grader usually levels the dirt road). Or you can walk in. Whichever way is used, the trouble is well worth it.

The Panama Canal Review asked one of Penonomé's outstanding citizens, Sr. Simeon Conte, who is well known as a writer, for a description of the place. This is what he wrote:

"The Zarati River springs from the Isthmian Andes, north of Penonomé, in the Trinity Mountain in Capira district. At Penonomé, where it turns into a gigantic horizontal 'S,' the river rushes southward into the strangling walls of La Angostura.

"La Angostura is a rocky canyon about 1 mile long that narrows at the bottom from 10 feet to 3 feet. It is a scant 3 miles from Penonomé, on the left from the road linking Penonomé and La Pintada.

"According to 'The Ancient Civilizations of the New World,' written by North American archaeologist A. Hyatt Veryll around 1924, the Guacamaya Mountain, which towers over the southern of horizon of Penonomé and La Pintada, was an active volcano about 4,000 years ago. The author is of the opinion that the Guacamaya's eruptions account for the present topographic features of certain areas in Coclé Province.

"Be that as it may, La Angostura is one of the most scenic spots in the interior of the country. The Zarati River flows between huge rocks marked by projections so precise in their geometric profiles that they strike the viewer as having been chiseled by man himself. On sunny afternoons, the falling water and its curtain of mist glisten with the polichromy of the rainbow.

"The place is romantic and evocative. 'Penonomeños' of all times have made it a favorite spot and by the banks of the foamy torrent many maids have murmured 'yes' to the suitors who became their husbands.

"At sunset, the panorama in La Angostura becomes extraordinarily beautiful. The sun, dipping behind the Guacamaya peak, throws its dying rays into the torrent itself, piercing the length of the canyon and casting about tonalities of incredible beauty.

"One lives a moment of poetry in the brief twilight.

"At the peak of the dry season, in April, the charm of La Angostura is at its best. The river, running low, hurls itself into a hole carved in the rock over the centuries and gushes out from a lower opening in the rock.

"That is La Angostura—a song of water flowing from an impressive rocky throat."

Chorrera Falls has been a favorite swimming hole for generations of Panamanians. Here, the Caimito River plunges 33 feet into a natural pool.

SHIPPING

New Maersk Freighter

THE MAERSK Line's newest cargo ship, the *Cornelia Maersk*, a blue-hulled addition to the Maersk fleet, is arriving in Balboa the first part of June on her second visit to the Canal after making her maiden voyage to the Far East via New York and the east coast of the United States. The 11,000 deadweight ton ship is the second in a seven-vessel series of new Maersk line ships, three of which are being built in Bergen, Norway, and two others in Sweden.

Very highly automated, the *Cornelia Maersk* can sail with an unmanned engineroom while the main engine is controlled from the bridge. All instruments and controls are centralized in an insulated, air-conditioned control room on the third deck.

C. B. Fenton and Company, which handles the Maersk Line at the Canal, announced that the *Cornelia* would join the Maersk Line services between eastern Canada, U.S. ports on the Atlantic and Pacific, the Far East and Southeast Asia. These services are being maintained by 16 to 18 vessels at the present time.

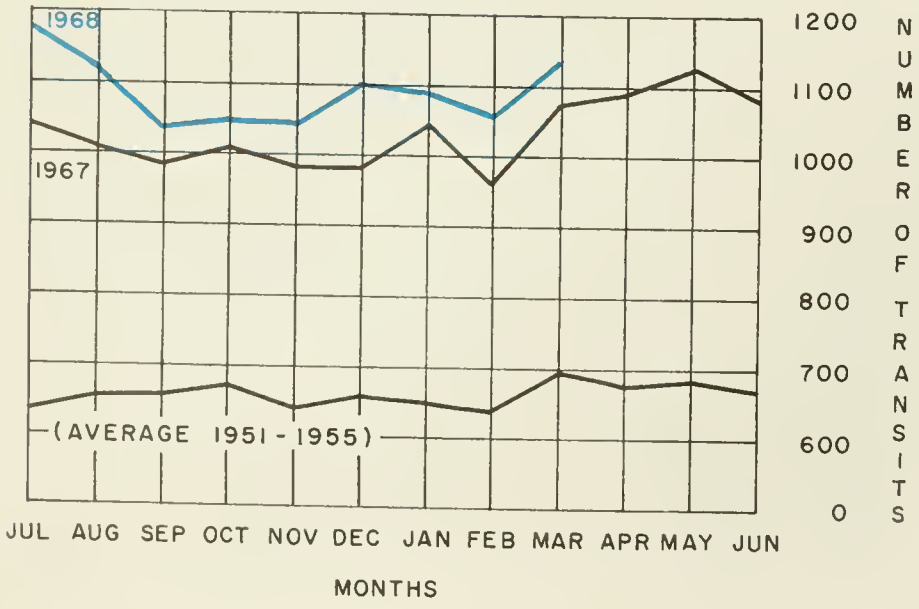
New Lykes Liner

THE NEW $12 million SS *Letitia Lykes*, a highly automated Gulf Clipper added recently to the Lykes Brothers Steamship Company fleet, passed through the Canal in February on her maiden voyage from the U.S. gulf to ports in Japan, Korea, Okinawa, Formosa and Hong Kong. She is the 32d new ship to join the Lykes Line fleet in the company's fleet replacement program which will ultimately cost an estimated half billion dollars. The *Letitia* replaces a new ship of the same name which was battered and sunk by hurricane Betsy in 1965 while outfitting in New Orleans.

According to an article in *Brandon's*

(See p. 14)

Capt. R. J. Wesley, President of the Canal Zone Pilots' Association, right, presents Commodore George Campbell of the Shaw Savill Line, an honorary membership in the Canal Zone Pilots' Association. The Commodore, who will retire when the SS Gothic returns to England, also received a Panama Canal Honorary Marine License from Capt. A. L. Gallin, Panama Canal Navigation Director, left. The framed copy of the license is held by Mrs. Campbell. The ceremony took place on the bridge of the Gothic as it passed through the Panama Canal recently. Commodore Campbell joined the Shaw Savill Line in 1927. His first command was the Samsylvan.



PANAMA CANAL TRAFFIC

STATISTICS FOR THIRD QUARTER FISCAL YEAR 1968

TRANSITS (Oceangoing Vessels)

	1968	1967
Commercial	3,281	3,090
U.S. Government	388	212
Free	28	21
Total	3,697	3,323

TOLLS°

Commercial	$20,636,139	$19,205,955
U.S. Government	2,330,702	1,342,326
Total	$22,966,841	$20,548,281

CARGO°°

Commercial	23,928,842	21,854,242
U.S. Government	2,074,013	1,558,097
Free	94,191	150,937
Total	26,097,046	23,563,276

° Includes tolls on all vessels, oceangoing and small.

°° Cargo figures are in long tons.

Skippers Shun Klaxon Sound

(Continued from p. 5)

bow-mooring tower at Marsa el Brega. A mooring buoy, held in place by anchors buried in the lake bottom, floats a short distance away. Such devices, located in deep water several miles from shore, are becoming more and more common as tanker size increases. Ships are held by mooring lines led out from the bow and are free to swing 360 degrees to allow for wind and current variations. Tankers using bow moorings generally load or discharge their cargoes through floating hoses connected to submarine pipelines.

A floating pier, held by one anchor to permit it to swing with the wind, is used to simulate ship-to-ship berthing. The need for ships to tie up alongside one another in open water is rare but occasionally occurs when a very large tanker must pump part of its cargo into a smaller ship before the former can enter a relatively shallow harbor.

A similar pier, this one immobile, provides experience in putting a ship alongside a dock. Traffic lights at each end are wired to shock-measuring devices on the fendering system of the pier. If a captain brings his model alongside as he should, the lights stay off. If he gives the dock a gentle nudge, the green light goes on. A harder jolt results in a yellow light and tells him that a full-sized pier would have been damaged. When the red light goes—accompanied by a nerve-shattering klaxon—he can be thankful strength of the dock isn't in scale to that of an actual one. The red light means he probably would have demolished the dock under normal circumstances. The klaxon seldom sounds, incidentally.

Also on the lake are two conventional sea berths. These consist of three buoys arranged in a semicircle. To moor, a ship must drop both anchors, then back toward the buoys, paying out anchor chain as it goes, until mooring wires can be carried from the ship's stern to the buoys. The mooring wires at the stern and anchors at the bow hold the ship in a fixed position during the transfer of cargo.

The experience of two members of a recent training group at one of the sea berths helps illustrate the accuracy with which the models simulate actual conditions. One captain, a Frenchman, commands a 697-foot tanker of conventional design. The ship's bridge is located atop a midships house, roughly halfway between bow and stern. The other captain is an American who is master of an "all-aft" tanker. In this design, which has grown in popularity during the last 5 years, there is no midships house. The bridge sits atop the "afterhouse" on the ship's stern, which has been heightened by two decks to hold the accommodations formerly located amidships. Although the American's tanker is only 100 feet longer than that of his French colleague, he looks down from the bridge on 600 feet of main deck. The French captain sees less than half as much.

During their work at the sea berth, in a model of the all-aft *Esso Malaysia*, the French master consistently went too far into the berth before dropping his anchors. The American, accustomed to gaging distances from a point far back from his ship's bow, had little difficulty, even though he had never seen a full-sized sea berth and the real *Esso Malaysia* is 265 feet longer than his own ship.

The story—and the fact the Frenchman mastered the maneuver before his 2-week stay ended—also demonstrates the primary reason why Esso REM exists.

The construction and maintenance of the training center and its facilities were entrusted to Sogréah, a world-renowned hydraulic research company which has its base in Grenoble. Sogréah (an acronym for Société Grenobloise d'Etudes et d'Applications Hydrauliques) is no stranger to the Jersey organization, nor, indeed, is the concept of using scaled-down tankers to simulate actual operating conditions.

In 1959 the company was contemplating construction of its first 80,000-deadweight tankers. Since the vessels represented, at the time, a significant increase in size over existing tankers, there was a question regarding their ability to negotiate such restricted waterways as the Suez Canal. To determine how manageable the new ships would be, Jersey contracted with Sogréah to construct a scale-model bend of the Suez and a self-propelled model of the proposed tankers. A specially trained Sogréah engineer, his eyes where those of the ship's captain would be, piloted the model tanker through the model canal again and again. Wind direction and speed, water depth, current, all were in exact proportion. Test results showed the new design to be a fine-handling ship. The tankers were built and, on subsequent voyages through the Suez, confirmed the remarkable accuracy with which their handling characteristics had been reproduced at Grenoble.

Although no one knew at the time, the existence of the world's most unusual marine training center had been assured and, with it, the continued safety and efficiency that have always characterized the operation of Jersey's tanker fleet.

The lily-pond stillness of this lake may not look much like an ocean but the captains being trained here are impressed with how much they learn in the lake about ship handling.
Photo by Standard Oil Co. (N.J.)

ANNIVERSARIES

(On the basis of total Federal Service)

CIVIL AFFAIRS BUREAU

Clarence W. Marshall
Detention Guard

MARINE BUREAU

Kenneth L. Jamieson
Truck Driver

40

ENGINEERING AND CONSTRUCTION BUREAU

Carlos H. Castillo
Machine Operator

C. C. Critchlow
Motor Launch Operator

John A. Everson
General Foreman Electrician

HEALTH BUREAU

Percival L. McDonald
Hospital Attendant

(Continued from p. 12)

Shipper and Forwarder, the Letitia Lykes and her sister ships are the largest cargo vessels ever built in New Orleans, as well as the largest and fastest ships ever to join the Lykes fleet. They have a deadweight of 14,000 tons, a cargo capacity of 750,000 cubic feet and a speed in excess of 20 knots. The cargo transports are completely air-conditioned, have accomodations for four passengers and are equipped with the latest and finest cargo handling and stowing quipment available.

P & O. Cruises

TWO OF the largest of the P & O passenger ships arrived at the Canal during April from the west coast of the United States on 3-month cruises, one called Springtime, the other Jolly Swagman. They were the superliner *Oriana* and the 45,000-ton *Canberra* with more than 1,800 passengers each. The *Oriana* arrived April 6 and the *Canberra* April 27. Both docked in Balboa and Cristobal and left for Europe including England, France, Spain and Portugal. On the homeward voyage around the Cape of Good Hope and across the Indian Ocean to Australia, the *Orianas* springtime itinerary includes calls at Sydney, Auckland, Suva, and Honolulu. The *Canberra* is following a similar schedule but the passengers are being offered optional tours to South Africa and to the Australian Outback. Norton Lilly represent the line at the Canal.

ADMINISTRATIVE SERVICES DIVISION

Ralph F. L. Blades
Photocopying-Equipment Operator

Arnold W. Marshall
Clerk-Photography

MARINE BUREAU

Aston T. Greene
Oiler-Floating Plant

Ernest B. Rainier
Captain of the Port

Richard T. Baltozer
Leader Lock Operator-Machinist

Richard C. Sergeant
Captain of the Port

Rudolph Young
Asphalt or Cement Worker

COMPTROLLER'S OFFICE

Daile D. Keigley
Supervisory Staff Accountant

ENGINEERING AND CONSTRUCTION BUREAU

30

Glenn H. Burdick
Administrative Officer

Adán Castillo
Lead Foreman-Paver

Dcroteo Hernández
Paver

German C. Lambridge
Maintenanceman-Distribution Systems

Norman S. Lewis
Boilermaker

Frank G. Layne
Helper Electrician

Aston S. Smith
Electrician—Lineman

Richard A. Armstrong
Helper Central Office Repairman

Arthur W. Davis
Carpenter

Miguel De la Rosa
Seaman

Ira M. Payne
Construction Inspector—General

Luis Sam
Electrician—Lineman

Arthur B. Butcher
Boiler Tender-High Pressure

Enrique Charles
Oiler—Floating Plant

Joseph M. Evelyn
Helper Machinist—Maintenance

Cleofas Gómez O.
Winchman

SUPPLY AND COMMUNITY SERVICE BUREAU

John E. Hogan
Supervisory Supply Clerk

Arthur Hilton
Leader Milk Plant Worker

Arthur W. Smith
Supervisory General Supply Specialist

L. M. Elliott
Laborer

Ephraim R. Innis
Guard

F. D. Stewart
Lead Foreman Laborer-Cleaner

TRANSPORTATION AND TERMINALS BUREAU

Benjamin S. Shoy
Cargo Checker

Herman J. Feurtado
Time and Leave Supervisor

Juan R. Griffin
Bus Service Inspector

Noel T. James
Chauffeur

Arthur A. Ollivierre
Chauffeur

Victor A. Watson
Truck Driver

CIVIL AFFAIRS BUREAU

Lillian R. Gibson
Teacher—Elementary L.A. Schools

Hamilton H. Lavalas
Junior High Teacher. L.A. Schools

Clyde E. Thomas
Detention Guard

Alfred A. Douglas
Clerk

George A. Martin
Police Captain

Howard J. Toland
Police Sergeant

Erell C. Alexis
Detention Guard

HEALTH BUREAU

Pedro Vásquez
Leader Exterminator

Iris A. Crichlow
Nursing Assistant—Medicine and Surgery

Eric A. Edwards
Diet Cook

CANAL HISTORY

50 Years Ago

SOCIAL ACTIVITIES in the Canal Zone 50 years ago were geared to the war effort and the Committee for the War Fund of the American Red Cross sponsored its first entertainment trip through the Canal April 28, from Cristobal to Balboa. Lady Mallet, wife of the British Minister in Panama and founder of the Panama Red Cross, made an urgent call for books and magazines for wounded New Zealand soldiers who were to transit the Canal aboard a hospital ship.

•

An item in the local press said that due to increased requirements of the U.S. Government, prices of tobacco and cigarettes went "sky high" in the commissaries and clubhouses and no more of a popular chewing tobacco, would be shipped to the Isthmus for the remainder of the war. According to the *Panama Canal Record*, wheatless Mondays established March 18 in the Canal Zone, produced a 31 percent reduction in the consumption of flour in 1 month.

•

A news item in the *Star and Herald*, May 7, stated 21 members of The Incas, the oldest society in the Canal Zone, composed of "oldtimers" who came to work for the Canal within 3 months after the purchase of the French Canal properties, celebrated their 14th annual banquet at the Century Club. The menu included such delicacies as canape of caviar Romanoff, broiled spring chicken, and other gourmet delights.

•

According to the *Panama Canal Record*, the construction of the nurses' home, Colon Beach, was completed during the month of May by the Construction Division and turned over to the Health Department.

•

The Colon correspondent reported that residents of Gatun were scared by a queer looking object on horseback which turned out to be a policeman wearing a blue veil as a protection against the hordes of mosquitos that come out at the beginning of rainy season.

25 Years Ago

THE CANAL ZONE traffic laws and regulations were amended April 1, 1943, making effective on April 15 a change from left-hand to right-hand driving on Canal Zone streets and highways. The change was made simultaneous with that in the Republic of Panama. The accepted explanation of the origin of left-hand driving on the Isthmus is that it was established by British West Indian carriage drivers who came to the Isthmus in early construction days.

•

Coincident with the establishment of right-hand driving in the Canal Zone and Panama, the Trans-Isthmian Highway linking the two terminal areas of the Canal was officially opened to the public April 15, 1943.

•

A messenger at the Balboa Heights Administration Building, Hopeton Simms, claimed to be the first cyclist to cross the Isthmus on the new Trans-Isthmian Highway. He made it in 2 hours and 45 minutes, according to an item which appeared in the local press.

•

More than $1 million was invested in War Bonds by Canal Zone buyers during April and total sales reached $12 million as of May 11, 1943.

10 Years Ago

A THREE-SPAN arch truss type bridge design submitted by Sverdrup & Parcel Engineering Co. of St. Louis, was selected for the permanent Canal crossing after preliminary designs for the bridge were reviewed by the Board of Consultants here April 10, 1958.

•

An emergency repair job on approximatey 8,000 sq. ft. of floor slab in the east chamber of Pedro Miguel Locks curtailed transit operations for the first time in 44 years of Canal operations 10 years ago.

•

Domestic conversion to 60-cycle current began on the Pacific side and the Central Labor Office Branch of the Personnel Bureau moved from Building 69 to Ancon.

One Year Ago

APRIL 1967 was another record month for Panama Canal traffic with a daily average of 39.6 ships passing from ocean-to-ocean.

•

A May 1 report on the Cut widening project which had been underway for a little over 3 months showed that approximately 400,000 cubic yards of Zone 1 (above elevation 95) material had been removed by the Foster Construction Company.

Two motorists stop for a chat on Gaillard Highway on the approach to Pedro Miguel in 1917. Notice that the road was much narrower then but traffic was lighter and the pace of the motorist, perhaps life in general, was more leisurely.

Computers Give Answers To Canal Slide Problems

ONE OF man's newest technical tools —the computer—is now being used to solve one of the oldest problems of the Panama Canal—slides. The results are greater safety and economy for the Canal.

Landslides have long been one of the most vexing of engineering problems. The Panama Canal made world headlines because of the disastrous slides which delayed construction at a cost of millions of dollars and even closed the Canal after it was opened to traffic. Stability of the channel slopes still requires the constant attention of engineers and geologists.

Laymen may justifiably wonder why engineers have been unsuccessful so often in designing excavation slopes or building embankments safe against sliding. The collapse of a building or a bridge is a rare occurrence compared with the frequency of landslides. The basic reasons are simple.

The designer of a steel bridge knows a great deal about his construction material. He knows how strong the steel is and how much it will bend or stretch under the weight it must bear. Also, the properties of steel are constant because it is man-made; its manufacture is closely controlled and the final product, in the form of beams or girders, is inspected and tested before the structure is built.

But the engineer who designs a structure of soil or rock, such as a dam or a railroad embankment, is dealing with raw materials as provided capriciously by nature. He may grade the rock and compact the soil, but the final properties of these materials—no matter how closely construction is controlled—usually vary from point to point and can be only approximately determined. Also, whereas concrete and steel have one kind of strength called "cohesion," soil and rock have two distinctive types, cohesion and friction. These act together in an extremely complex way, and, in addition, are greatly affected by ground water.

In the design of excavation slopes, such as in the widening of the Panama Canal, the engineer's challenge is even greater than when building the dam or railroad embankment. For here he does not build the slopes but only shapes the materials already constructed by nature so that the slope will hold up safely, without requiring unnecessary quantities of costly excavation.

For help, the engineer turns to the

This rock slide at Culebra (Gaillard) Cut during construction days smashed and partially buried a steam shovel. At left, a crane moves in to remove the debris from the slide, which occurred on the south end of Gold Hill in 1913. Slides were common in those days.

geologist who examines the surrounding terrain, drills holes, samples and tests the sub-surface materials and determines changing levels of ground water and patterns of seepage. He also plots the joints, faults and bedding planes that criss-cross the earth's crust. However, the geologic program, no matter how extensive, gives the engineer only an approximate picture of the actual strength, elasticity, porosity and other rock or soil characteristics upon which his design must depend.

From this incomplete data, the engineer has to define conditions, make analyses and calculations. He focuses his attention on two basic characteristics: the stresses in the ground caused by the forces of gravity which tend to flatten the slope; and the strength of the soil and rocks that will sustain the slope against these forces. Both of these properties are highly complex.

Further difficulties arise because these stresses are not evenly distributed. As to the forces of resistance, the engineer concerns himself primarily with what is known as shearing strength—the strength which materials possess to prevent one portion of a mass from sliding along an adjacent portion. This is the type of material failure that occurs in landslides. Shearing and other types of strength, plus the effects of water and its movements all must be taken into consideration by the engineer.

When the Panama Canal was built, very little progress had been made in solving these problems and the planning of excavation slopes was largely a matter of intuition and experience. Catastropic slides were the result. They not only played havoc with cost estimates and construction schedules but they also added greatly to the final cost of digging the Canal because when the slopes failed the natural rock structure was destroyed and the resulting final slopes had to be excavated much flatter than if they had been properly designed in the first place.

Since then, slope stability has been subject to intensive study and a highly specialized field of engineering, known as soils mechanics, has been developed to attack this problem. Judgement must still be exercised but new methods and theories have resulted in tremendous progress. Slopes and embankments are far safer and great excavation economies are being realized.

During the past decade, computers have contributed dramatically to progress in soils mechanics and slope stability. Now even the most complex engineering calculations can be performed in a fraction of the time formerly required. This is a great advantage when innumerable, time consuming trial and error computations have to be made.

Entirely new methods of analysis, formerly of theoretical interest only because of the mathematical complexity, suddenly became the practical design tools of the soils engineer. In addition, the speed of the computer has enabled the engineer to study a wide range of possible conditions affecting his problem.

For example, if the presence of an important geologic fault is suspected but not definitely confirmed, he can solve his problem to include the fault, or to exclude it, thus establishing its relative importance to the stability of his slope. The results might lead to further work for the geologist in the field, or it may be found that the suspected fault is relatively unimportant due to its position and the conditions surrounding it.

Though his knowledge of subsurface conditions remains limited, and always will, the engineer can analyze a far wider range of possible conditions and thereby make design decisions which are much more valid.

The Civil Engineering Branch of the

(See p. 20)

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TYPE AN ESTIMATE OF THE FACTOR OF SAFETY.
1.1
  1.10000  0.       -.976E 04  .383E 05
  1.06769  -.44629 -.976E 04  .383E 05
  1.08384  -.22315 -.268E 04  .146E 05
  1.09626  -.30176  .155E 04 -.497E 03
  1.10216  -.29094  .842E 02 -.340E 02
  1.10250  -.29026  .272E 00 -.133E 00
FS=  1.10250
LAM80A=  -.29026
DO YOU WANT DETAILED FORCE OUTPUT....
no

CALCULATIONS HAVE BEEN COMPLETED. TYPE A NUMBER.
  1  TO CHANGE THE SIDE FORCE ASSUMPTION
  2  TO ADJUST THE FAILURE SURFACE
  3  TO INPUT AN ENTIRELY NEW FAILURE SURFACE
  4  TO CHANGE SOIL PROPERTIES
  5  TO CHANGE THE PHREATIC SURFACE
  6  BOTH (4) AND (5)
  7  WHOLE NEW PROBLEM
  8  TO TERMINATE.
3
 NO X-COORD    YTL    YTBAR     YFS    RATIO     EBAR      NBAR      XN     PHI
  1   252.00  137.00  137.00  137.00          .000E 00
  2   280.00  181.10  101.29  131.46          .217E 02  .347E 01  278.03
  3   292.00  200.00 -855.22  129.92          .230E 01  .636E 01  287.15
  4   320.00  200.00  127.15  126.33  .011    .136E 03  .747E 01  306.40   0.
  5   356.00  200.00  142.41  124.42  .238    .282E 03  .703E 01  338.29   6.4
  6   382.00  212.00  146.71  125.08  .249    .311E 03  .690E 01  370.24   7.7
  7   400.00  218.70  150.08  125.54  .263    .339E 03  .760E 01  391.43  10.1
  8   420.00  226.14  154.90  127.71  .276    .354E 03  .731E 01  410.41  12.0
  9   440.00  233.58  159.68  129.88  .287    .368E 03  .769E 01  430.39  13.9
 10   468.00  244.00  167.79  134.84  .302    .369E 03  .748E 01  454.56  16.0
 11   494.00  254.23  176.83  141.63  .313    .346E 03  .708E 01  481.33  17.9
 12   520.00  264.46  186.15  148.43  .325    .321E 03  .730E 01  507.32  20.1
 13   545.92  274.66  198.30  157.90  .346    .276E 03  .664E 01  533.03  22.4
 14   560.00  280.20  202.19  163.04  .334    .272E 03  .662E 01  552.98  22.6
 15   580.00  288.07  209.61  172.04  .324    .253E 03  .594E 01  569.91  22.6
 16   600.00  295.94  216.94  181.04  .312    .234E 03  .588E 01  589.91  22.6
 17   621.92  304.57  227.86  194.01  .306    .196E 03  .483E 01  610.56  22.0
 18   640.00  311.69  236.98  204.71  .302    .166E 03  .466E 01  630.68  21.3
 19   662.00  320.34  250.73  220.47  .303    .122E 03  .381E 01  650.26  19.1
 20   684.00  329.00  265.87  236.24  .319    .817E 02  .353E 01  672.20  15.0
 21   720.00  332.00  301.44  267.92  .523    .776E 02  .231E 01  695.09   2.3
 22   750.00  348.07  328.12  299.52  .589    .400E 02  .123E 01  730.07   2.9
 23   773.89  360.87  339.62  332.00  .264    .417E 02  .128E 01  761.20  18.3
 24   776.00  362.00  341.75  334.87  .253    .343E 02  .261E 01  774.92  18.3
 25   795.95  362.00  362.00  362.00          .966E-03  .126E 01  779.28

CALCULATIONS HAVE BEEN COMPLETED. TYPE A NUMBER.
  1  TO CHANGE THE SIDE FORCE ASSUMPTION
  2  TO ADJUST THE FAILURE SURFACE
  3  TO INPUT AN ENTIRELY NEW FAILURE SURFACE
  4  TO CHANGE SOIL PROPERTIES
  5  TO CHANGE THE PHREATIC SURFACE
  6  BOTH (4) AND (5)
  7  WHOLE NEW PROBLEM
  8  TO TERMINATE.
 QUIT,
R 19.533+31.183
```

To the layman, this may look like gobbledygook. But it is actual input-output data printed by a keyboard console of the large IBM 7094 Computer at Massachusetts Institute of Technology for the stability analyses of Las Cascadas Hill. The engineer operates the computer through the keyboard, typing in data and instructions in accordance with the computer program, and receiving the results of lengthy computations in a matter of seconds. Thus the engineer actually converses with the computer in this operation.

CANAL COMMERCIAL TRAFFIC BY NATIONALITY OF VESSELS

Nationality	Third quarter, fiscal year—					
	1968		1967		1961-65	
	No. of transits	Tons of cargo	No. of transits	Tons of cargo	Avg. No. transits	Avg. tons of cargo
Belgian	27	72,295	15	76,232	12	51,936
British	347	2,538,600	329	2,366,928	330	2,081,299
Chilean	30	188,840	30	181,790	26	184,584
Chinese (Nat'l.)	27	163,099	23	183,482	17	114,964
Colombian	43	111,530	59	106,725	62	91,143
Danish	106	709,101	112	748,850	71	368,953
Ecuadorean	51	52,907	9	11,924	8	10,236
French	49	270,328	67	277,384	37	186,983
German	351	1,355,738	343	1,258,789	279	828,327
Greek	110	1,214,532	104	1,045,652	154	1,494,286
Honduran	42	18,600	50	34,443	50	40,194
Israeli	27	179,112	23	172,409	15	62,797
Italian	76	566,145	54	389,765	44	267,283
Japanese	262	2,121,405	208	1,744,606	192	1,101,520
Liberian	379	5,188,554	332	4,706,798	234	2,364,967
Netherlands	130	558,395	127	445,316	163	728,725
Nicaraguan	18	28,632	15	31,869	10	15,039
Norwegian	354	3,935,911	388	3,704,979	370	2,882,728
Panamanian	129	693,823	126	558,547	115	493,209
Peruvian	47	193,968	36	181,013	28	112,826
Philippine	25	120,040	24	128,378	18	85,503
South Korean	15	69,926	10	28,074	3	12,443
Soviet	30	172,911	10	64,083	10	74,618
Swedish	121	849,395	95	606,110	94	581,913
Swiss	14	11,550	15	28,212	9	11,857
United States	386	1,942,918	413	2,303,617	396	2,337,656
Yugoslavian	12	140,885	6	78,525	3	25,202
All Others	73	458,514	67	387,080	35	188,204
Total	3,281	23,927,654	3,090	21,851,580	2,785	16,799,395

MONTHLY COMMERCIAL TRAFFIC AND TOLLS

Vessels of 300 tons net or over—(Fiscal years)

Month	Transits			Gross tolls* (Thousands of dollars)		
	1968	1967	Avg. No. Transits 1961-65	1968	1967	Average Tolls 1961-65
July	1,177	1,039	960	7,400	6,205	4,929
August	1,117	1,008	949	6,751	6,392	4,920
September	1,023	988	908	6,370	6,057	4,697
October	1,048	1,005	946	6,754	6,157	4,838
November	1,041	985	922	6,672	6,028	4,748
December	1,100	987	946	7,133	6,084	4,955
January	1,094	1,043	903	6,916	6,318	4,635
February	1,055	968	868	6,685	6,049	4,506
March	1,132	1,079	1,014	7,028	6,831	5,325
April		1,094	966		6,823	5,067
May		1,128	999		7,005	5,232
June		1,088	954		6,820	5,013
Totals for fiscal year		12,412	11,335		76,769	58,865

* Before deduction of any operating expenses.

TRAFFIC MOVEMENT OVER MAIN TRADE ROUTES

The following table shows the number of transits of large, commercial vessels (300 net tons or over) segregated into 8 main trade routes:

Trade routes	Third quarter, fiscal year—		
	1968	1967	Avg. No. Transits 1961-65
United States Intercoastal	78	112	99
East coast United States and South America	405	434	563
East coast United States and Central America	171	171	131
East coast United States and Far East	763	657	522
East coast United States/Canada and Australasia	90	105	70
Europe and West coast United States/Canada	260	279	260
Europe and South America	363	348	316
Europe and Australasia	126	102	110
All other routes	1,025	882	715
Total traffic	3,281	3,090	2,786

Ships Growing Too Large for Many Harbors

THE PANAMA Canal is not alone in facing a growing number of ships too large to transit. Ships now are being built in many parts of the world that are too big to enter most harbors.

A recent issue of the German Tribune reported Germany's largest vessel, the 192,000-ton Shell tanker *Myrina*, had docked unladen in Hamburg. As yet, no port in the Federal Republic could handle a laden tanker of this size.

What is the point of building a tanker of this size to fly under the Federal Republic ensign when it will never be able to berth in its own country, the writer asked.

"Shipping nowadays is so internationally minded that a narrow nationalistic outlook is outmoded. The *Myrina* was built in Northern Ireland and docked in Hamburg only to have its hull painted in the giant Elbe 17 dry dock originally built to handle Third Reich destroyers.

"Belfast has no dry dock large enough to handle a vessel of this size. The new tanker was, incidentally, built in a British yard partly because of the offset agreement for the foreign exchange costs of Britain's Army of the Rhine.

"At Kiel's Howaldt yard, on the other hand, another super-tanker commissioned by Shell of England is nearing completion. Because of new regulations of maximum draft the second tanker will have 210,000 deadweight tons.

"Is this utterly illogical? Far from it. It is one of the reasons why closure of the Suez Canal has had so little effect on the oil market in Germany. Federal Republic tankers happened at the right moment to be conveying oil for other countries while tankers that are in the eyes of Arab countries neutral, shipped petroleum for Germany. Oil is an international business."

The *Myrina*, the largest ship to be launched to date in Europe, is a turbine drive tanker 1,050 feet long and with a beam of 155 feet. Sweden has a 230,000 tonner due for delivery at the end of 1969 and Germany is building three of 240,000 tons for delivery in 1969 and 1970.

The Marine Engineering Log of

November 1967 said two more tankers of 240,000 and 130,000 tons are under construction in Italian shipyards. The larger of the two will be the biggest ship ever built in Italy. Like the other ships of her class, the largest single screw ships ever constructed, she will be highly automated and will feature the bulbous bow designed by Esso engineers to improve speed and economy of fuel consumption. She will be 1,100 feet long and have a beam of 170 feet and draft of 48 feet, with a service sped of 17 knots. She is scheduled for completion in 1969.

The same magazine said the world's largest tanker is under construction at the Ishikawajima Harima shipyards in Yokohama. Of 276,000 deadweight tons, she is the first of six to be used by Gulf Oil's Bantry Bay operation. She is owned by National Bulk Carriers and chartered to Gulf.

But bigger tankers are still to come.

Mitsui Zosen, one of Japan's leading shipbuilding companies, recently disclosed the basic design specifications of a mammoth 400,000 deadweight-ton tanker it is offering to ship operators.

A company spokesman said many problems, such as hull vibration and the relationship between main engine output and ship's speed, still had to be solved. And the location of the bridge would have to be decided by the owners.

The end is still not in sight. Daniel D. Stohmeier, vice president of Bethlehem Steel Corp., in charge of shipbuilding, said in an interview appearing in the *American Bureau of Shipping Surveyer* that to say ships will stop getting bigger after a certain point is reached is like talking about limits to track records.

"When Bethlehem built a class of 28,000 deadweight-ton tankers in 1948, they were heralded as 'supertankers' by the press. When we brought out the *World Glory* in 1954, we were told that a ship of 45,500 deadweight was too big for any practical use. Then we built the *Manhattan*, more than twice as big. There is no practical limit to the size of ships."

Correction

Some of the transit figures for the second quarter of fiscal year 1968 appearing in the February issue of The Panama Canal Review were incorrect. Total figures should have been: commercial vessels, oceangoing, 3,189; small, 116; total commercial, 3,305; U.S. Government vessels, oceangoing, 350; small, 30; and total commercial and U.S. Government, 3,685.

PRINCIPAL COMMODITIES SHIPPED THROUGH THE CANAL

(All cargo figures in long tons)

Pacific to Atlantic

Commodity	Third quarter, fiscal year— 1968	1967	5-Yr. Avg. 1961-65
Ores, various	1,271,059	1,164,642	1,669,063
Boards and planks	646,072	N.A.	N.A.
Metals, various	629,669	311,820	304,018
Sugar	502,219	432,293	467,720
Fishmeal	495,547	310,136	N.A.
Iron and steel plates, sheets, coils	459,150	N.A.	N.A.
Food in refrigeration (excluding bananas)	435,017	341,895	264,520
Bananas	353,780	364,031	293,481
Lumber, miscellaneous	351,331	N.A.	N.A.
Iron and steel manufactures, miscellaneous	322,394	N.A.	N.A.
Wheat	251,555	54,112	467,292
Petroleum and petroleum products	247,476	268,076	410,399
Pulpwood	239,348	203,589	126,688
Plywood	177,403	N.A.	N.A.
Canned food products	153,752	200,181	222,514
All others	2,396,700	4,729,843	3,585,694
Total	8,932,472	8,380,618	7,811,389

Atlantic to Pacific

Commodity	Third quarter, fiscal year— 1968	1967	5-Yr. Avg. 1961-65
Coal and coke	3,680,929	2,838,219	1,505,514
Petroleum and products (excluding asphalt)	3,630,113	4,041,140	2,867,923
Phosphate	1,077,614	917,366	537,037
Corn	947,100	636,400	496,187
Soybeans	600,673	447,225	381,430
Ores, various	463,560	412,173	75,586
Metal, scrap	422,687	719,540	466,944
Sorghum	289,662	97,862	N.A.
Wheat	248,258	111,972	82,552
Metal, iron	233,026	55,761	45,571
Rice	218,441	155,463	34,651
Sugar	191,045	153,016	174,394
Paper and paper products	173,867	137,876	87,202
Cotton, raw	170,380	157,909	118,155
Chemicals, miscellaneous	145,171	253,997	159,238
All others	2,502,656	2,335,043	1,955,621
Total	14,995,182	13,470,962	8,988,005

CANAL TRANSITS — COMMERCIAL AND U.S. GOVERNMENT

	Third quarter, fiscal year— 1968 Atlantic to Pacific	1968 Pacific to Atlantic	1968 Total	1967 Total	Avg. No. Transits 1961-65 Total
Commercial vessels:					
Oceangoing	1,659	1,622	3,281	3,090	2,785
Small °	81	50	131	128	126
Total commercial	1,740	1,672	3,412	3,218	2,911
U.S. Government vessels: °°					
Oceangoing	224	164	388	212	61
Small °	9	15	24	26	39
Total, commercial and U.S. Government	1,973	1,851	3,824	3,456	3,011

° Vessels under 300 net tons or 500 displacement tons.

°° Vessels on which tolls are credited. Prior to July 1, 1951, Government-operated ships transited free.

Inspecting computer output results is Gary Guazzo, right, soils engineer of the Civil Engineering Branch, while Tony Mann, chief of the branch, studies the problem plans. Mrs. Naomi Wright, computer programmer with the IBM Company, is seated at the computer control console.

Computers Boost Canal Efficiency

(Continued from p. 17)

Engineering Division, which is responsible for slope stability problems on the Canal, is applying the latest development in computer methods of analysis. On the Canal widening project now underway, the highest soft rock slopes on the entire Canal are being excavated at Las Cascadas Hill. Improper design of these slopes could cause failures dwarfing even the worst slides of construction days.

After lengthy geologic investigation of this problem, it became evident that the complex conditions existing in this hill could be adequately analyzed only by computer methods.

Assistance was obtained from slope stability experts at Massachusetts Institute of Technology in adapting computer programs for applications to the problems. Several methods of analysis were run on the IBM 7094 computer at MIT to evaluate specific factors and to determine conditions which should be defined for the design analysis.

When these basic problems had been resolved, the actual slope design was undertaken by the Civil Engineering Branch, with successive design problems run on computers at the McDonnell Automation Center at St. Louis.

Tony Mann, chief of the Civil Engineering Branch, ran several of the problems at MIT and coordinated the project with university experts. Mann, who provided the information for this article, did much of the computer work at St. Louis, also.

Major slope changes resulted from this study and excavation is now underway in the field with far greater confidence in the safety of the new Canal slopes.

Meanwhile, the Civil Engineering Branch proceeds with the development and application of computer methods on the continuing slope problems of the Canal widening project, the analysis of old and new slides in the Canal and the evaluation of excavation cost and methods on other Canal improvements as well.

Many computer solutions now are being handled entirely in the Canal Zone by use of the IBM 1130 machine operated by the Schools Division. This machine is proving capable of handling a wide variety of analytical methods and expanded magnetic storage will soon increase the range of problems which can be processed. At the same time, new computer programs constantly are being obtained, evaluated and adapted for use on Canal problems.

The use of computer is part of the continuous, overall task of upgrading the effciency of the Panama Canal.

Panamanians Avid Fans of Cockfighting

THE SMALL winged gladiators charge each other furiously and viciously. With each flurry of wings, wicked dagger-like spurs flash as beaks clamp tightly on skin or feathers for a hold. Shouting themselves hoarse, spectators lay wagers as they follow the combat in the pit with eyes wide from the excitement.

The combatants display incredible courage. Biting, beating their wings and stabbing, they are intent only on killing.

Suddenly, one falls mortally wounded. Even in the throes of death, spur-heeled legs beat wildly, seeking out the foe.

The scene might well be from the days of the Roman Empire. Or from ancient China, long before the Christian era. But no. It's from today, as it has been over the centuries and it remains a spectacle not recommended for the squeamish.

Cockfighting dates back to the 5th century before Christ, when it was introduced by Themistocles into Greece, whence it spread throughout the Roman Empire. It originated in the Orient.

Today, cockfighting or cocking is popular throughout Latin America, where the sport was brought by the Spaniards. For years it was widespread in England, Ireland, Belgium, India, and Asia and flourished in parts of the United States. Now though, it is illegal in England, the United States, and some other countries.

Practically every city or town in Panama has cockfights on Sundays or holidays. In the capital city, the main cockpit is at the Club Gallístico, located on Vía España opposite the National Guard booth at the entrance to the Old Panama road.

The gamecock, which is a distinct variety, closely resembles the wild jungle fowl of India. Instinctively pugna-

(See p. 22)

Cockfights are fast and furious. The gamecocks use beaks, wings, and spurs.

Referee is custodian of bets between owners of gamecocks. His decisions on fights are final.

Gamecocks Are Trained For Battle

(Continued from p. 21)

cious and courageous to the point of exaggeration, the gamecock has been bred for thousands of years but for one purpose—to fight to the death.

Of the more than 100 recognized gamecock breeds, the small Spanish fighting cock is favored in Panama because of breed, aggressiveness and, of course, heritage. Its weight fluctuates between 2 pounds 15 ounces and 3 pounds 12 ounces, in contrast with the giant Belgian gamecocks of 12 pounds or more.

After the gamecock, the principal figures in cocking are the breeder and the pitter or handler. The former devotes time and money—for sport rather than for money—to the breeding of the fowl. The latter trains them for combat. Generally, the breeder keeps the chick for 12 months or until the spur is ¾-inch long; then the pitter takes over. The pitter removes the comb, shaves and feeds and trains the bird. After 6 to 8 weeks, the gamecock goes through "exercise No. 8," which is the decisive test. The pitter passes the gamecock around and between his legs, describing a figure eight, again and again. If by the 150th turn, the cock has not opened its beak, it is ready for the pit.

Weight is the decisive factor in a match, for the combatants must have identical weight. This is determined on the scales in the cockring. The match includes the amount of the wager between the owners, which is held by the referee. Should one of the gamecocks fail to appear in the pit, its owner loses half the wager.

In Panama City, cockfighting is governed by municipal ordnance.

When a contest is about to start, only the owners are allowed in the pit. They set the gamecocks to bite each other on the head, as an incitement to combat. After a few seconds, the cocks are released and the owners leave the pit. From then on, no one is allowed inside, except when the referee—who is the supreme authority—calls for a "careo" or confrontation. This occurs if both gamecocks cease fighting for 1 minute or if they draw apart 1 meter without attacking each other. When a "careo" is ordered, the handlers come into the pit, pick up their animals and are given 2 minutes to revive them, each according to his method. Only if both gamecocks have been deprived of sight in combat are the pitters allowed to stimulate them by hand when the contest is resumed.

The referee also acts in cases where the combat does not end in death. He may award the fight to the gamecock which has beaten down its foe and the latter offers no opposition for 1 minute, or he may call a draw if neither bird can keep on fighting either because of exhaustion or because of the extent of its wounds.

In combat, the fighting cock uses the wings to beat down its foe, the beak to hold on, and the spur to stab. Gamecocks in Panama are heeled with natural spurs, in contrast with other places where steel gaffs are used. The gamecocks are pitted shaved and combless. The former may be compared with the attire prizefighters wear in the ring; the latter is due to the fact that the comb would provide a very vulnerable target.

A cockfight lasts from a few seconds to as long as 15 minutes.

Weight is the main factor in matching gamecocks. Weigh-in takes place on scales at cockring.

Handlers incite their birds to fight before releasing them in arena.

Spectators sit or stand on tiers around the circular pit, which measures between 18 and 20 feet in diameter and has a 1½-foot barrier. Wagers are made throughout the course of the contest and the bettor can "cover up," as the fight progresses, by betting on the cock having the advantage if his original choice is doing badly. Of course, at that stage, he must offer odds.

Among cockfight bettors, it is a matter of personal honor to pay off without argument. In Panama, incidentally, bets still are laid in silver "pesos" worth 50 cents each. In the case of inter-province or international tournaments, bets usually run into the thousands of dollars.

Cocking is surprisingly widespread in Panama. Until relatively recently, it was a sport for the wealthy because gamecocks were imported and the price of the birds ran high. But as restrictions increased over the importation of fowl, gamecock breeding became more and more popular. An idea of how widespread the sport is, is provided by the fact that in the Club Gallístico alone some 80 matches are fought weekly on Saturdays, Sundays, and Mondays during the season which lasts from January through April. This means that weekly there are 160 gamecocks available for fighting, of which approximately half are new birds. If it is remembered that there are other cockrings in the city and that cockfights are held in many other places in the country, one can get an idea of how deeply the sport runs.

Very distinguished names in Panamanian society have been linked with cockfighting.

From a pastime for nobility, cockfighting has grown into a sport in which the rich can envy the humble for the possession of a fighting cock, whose crowing in the pit is a clarion of victory.

Gamecock on sign marks site of Club Gallístico on Via España, in Panama City.

Spectators sit or stand on tiers around circular cockring. Man pointing is shouting out his wager to any taker.

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